Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for:

Synthesis of Highly Fluorescence Nitrogen Doped Carbon Quantum Dots Bioimaging Probe, Their In vivo Clearance and Printing Applications

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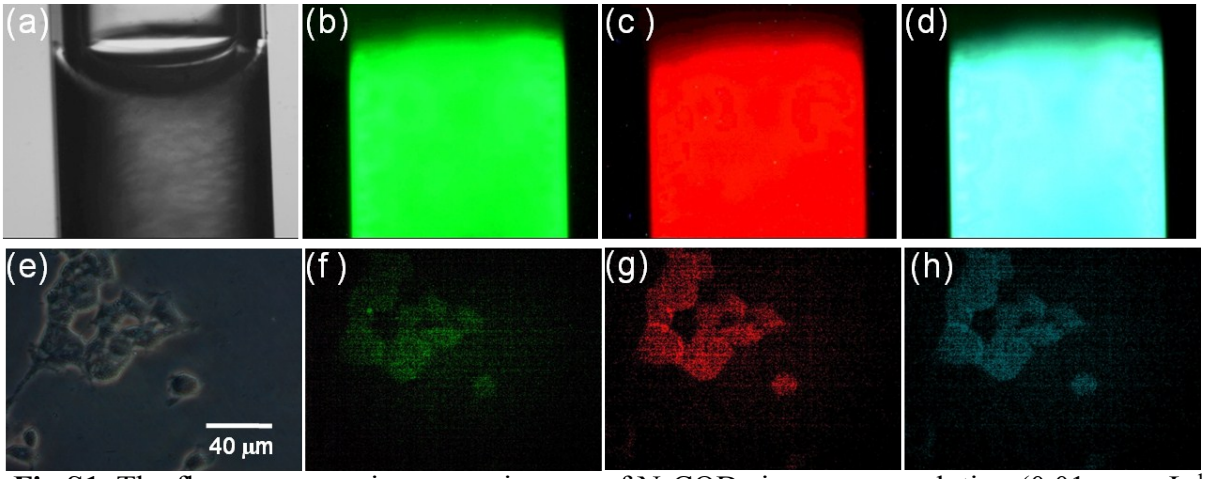

Fig S1. The fluorescence microscopy images of N-CQDs in aqueous solution (0.01 mg mL^{-1}) (a) white light (b) 461 nm; (c) 560 nm and (d) 633 nm. And MCF-7 cells under different band pass filters (e) white light; (f) 461 nm; (g) 560 nm and (h) 633 nm.

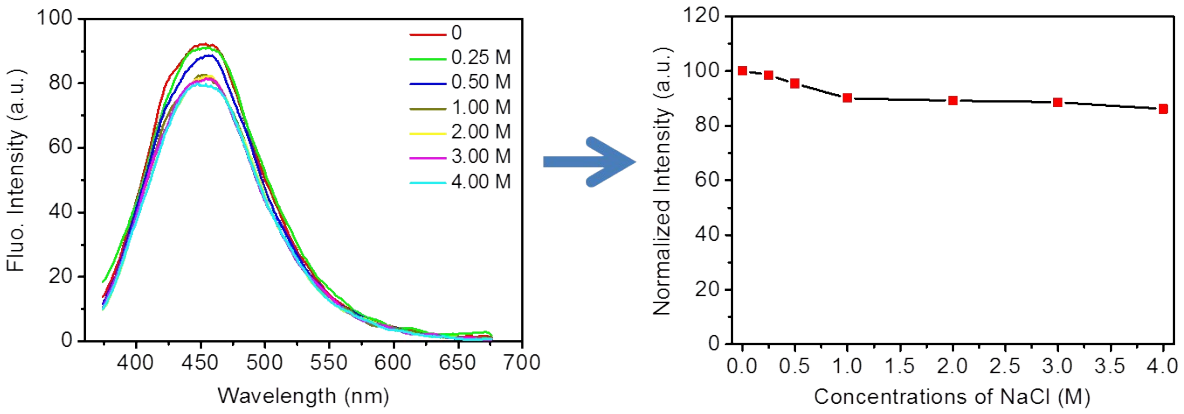

Fig S2. Effect of ionic strength on the fluorescence intensity of N-CQDs (0.01 mg mL^{-1}) (ionic strengths were controlled by various concentrations of NaCl).

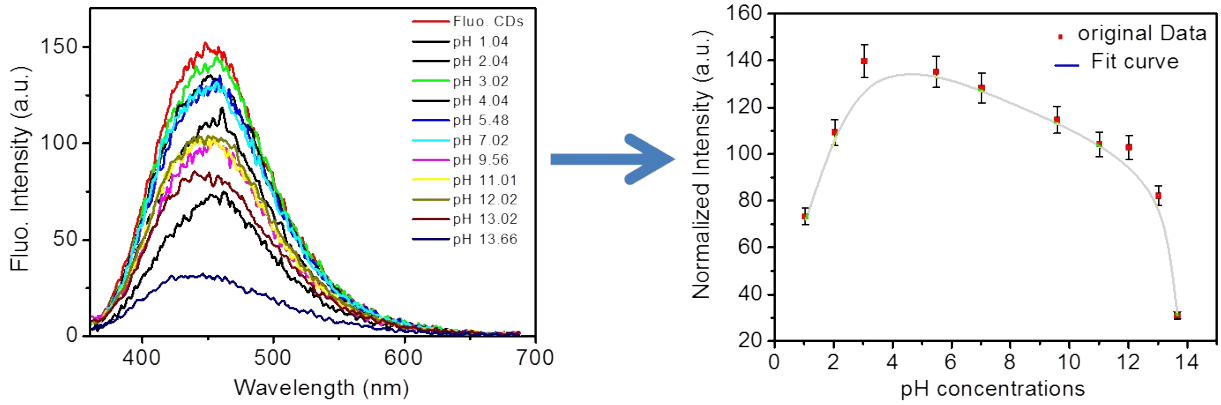

Fig. S3. Effect of pH on the fluorescence intensity of N-CQDs (0.01 mg mL^{-1}).

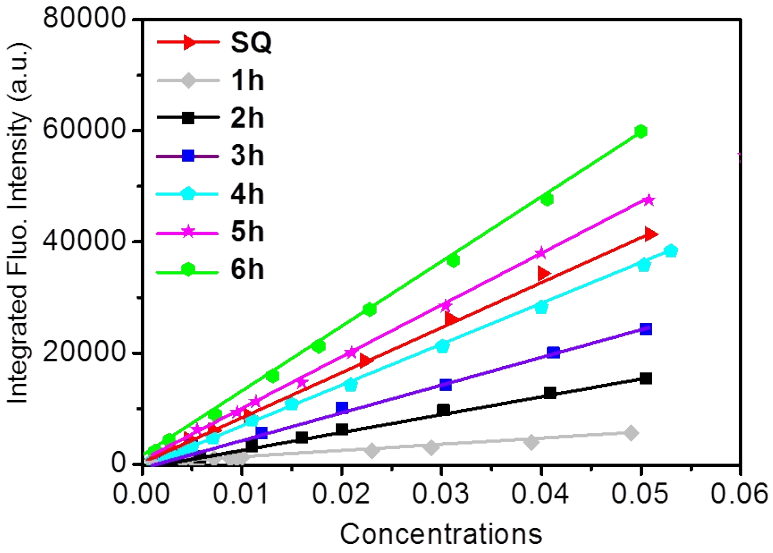

Fig. S4. Comparative Quantum yield graphs of CQDs which synthesized 1 hour to 6 hour reactions time.

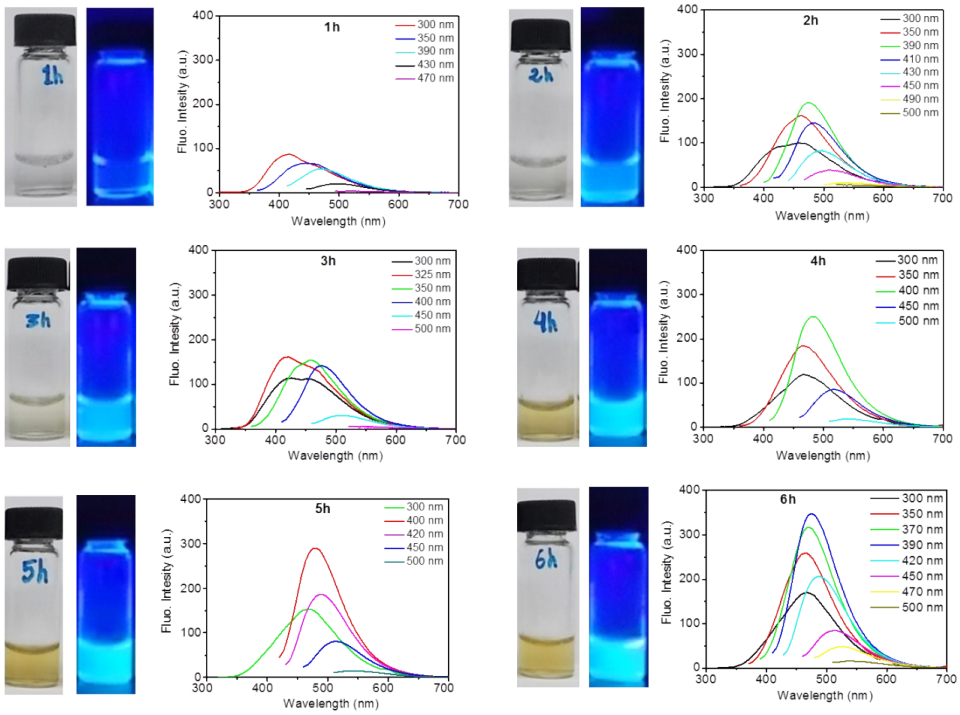

Fig. S5. Comparison among the excitation dependent behaviors spectra of N-CQDs prepared using different times according to table S1(1 to 6h). And in every left panel Photographs represent N-CQDs in water under daylight (left) and UV lamp (right).

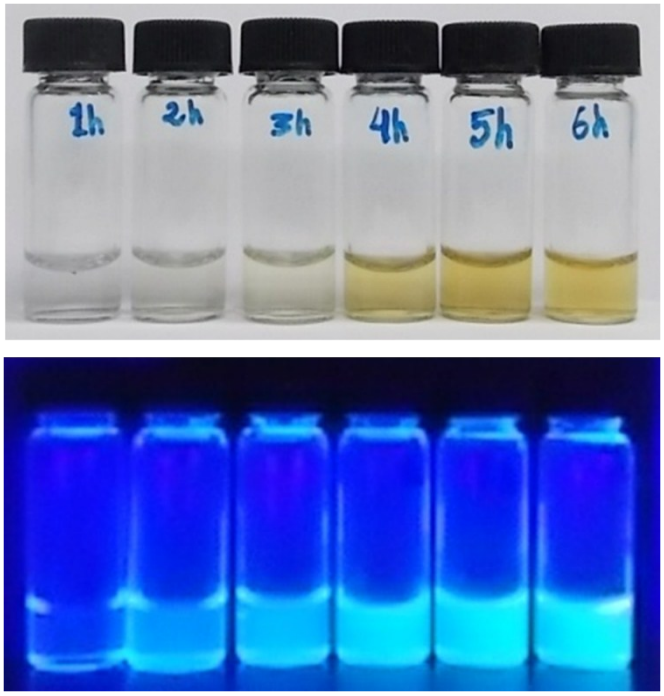

Fig. S6. CQD1 to CQD6 (according to S. Table-1) under white light (upper) and Under UV light (below) .Every vial contained 100ul of as prepared solution with 900ul of DI water.

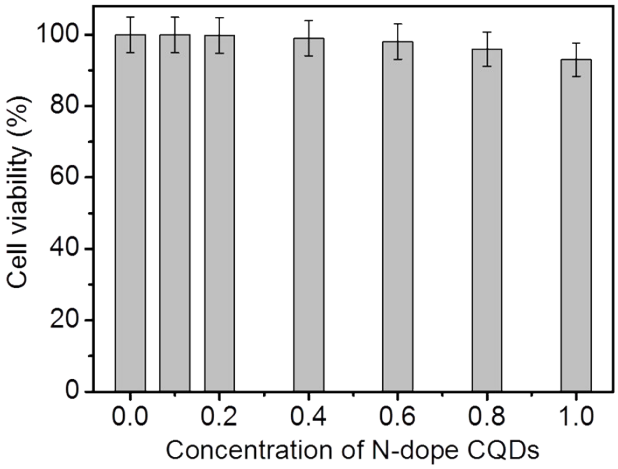

Fig S7. Viability of N-CQDs on MCF-7 cells.

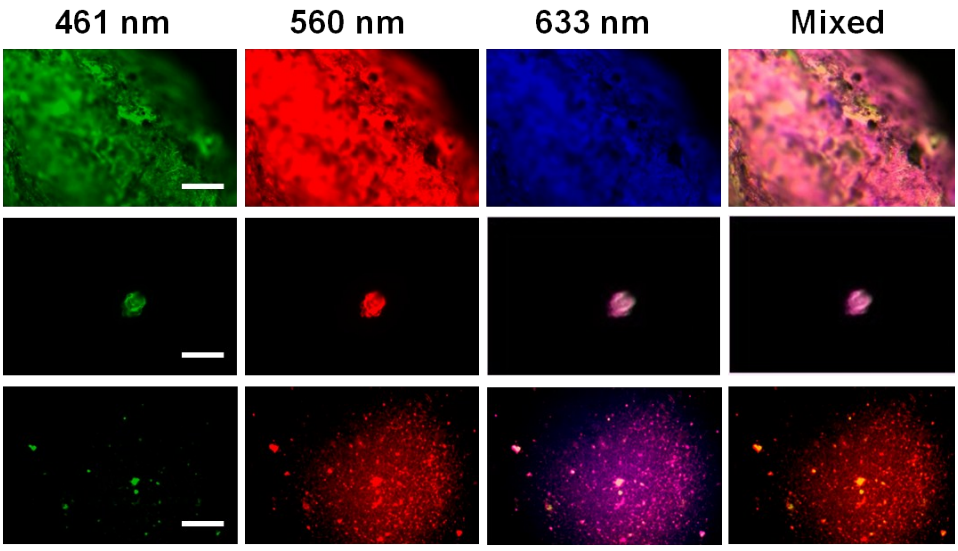

Fig S8. The fluorescent microscopy images of faeces, urine and blood collected from 24 hours post injected mice. Scale bar is 50 μm.

Table S1. Atomic percentage of N-CQDs.

Name	Peak BE	Atomic %
C1s	285.7	51.73
N1s	399.2	12.79
O1s	532.1	35.48

Table S2. Different reaction time conditions for fluorescent carbon dots synthesis (In Teflon-lined autoclave/200 ºC for 1 to 6 h).

Types	Reaction	Reaction Time (h)	Fluo. (Em. Color)	QY(%)
CQD1	Agarose and EDA , water, 200^0C (Agarose- Carbon Source, EDA- Amine Source)	1h	blue	6.46
CQD2		2hs		19.37
CQD3		3hs		30.37
CQD4		4hs		46.17
CQD5		5hs		59.95
CQD6		6hs	Yellowish blue	74.16

Table S3

Precursor	Synthesis method	Quantum yield (%)	Application	Ref
Candle soot	HNO_3 oxidation	3	Bioimaging	1
Chitosan	Hydrothermal treatment at 180°C	43	Bioimaging	2
Ascorbic acid	Heat treatment at 90 1C	3.22	pH sensing	3
Carbohydrate	H_2SO_4, HNO_3 treatment, amine passivation	13	Bioimaging	4
Glucose	Hydrothermal treatment at 200°C	1.1–2.4	Bioimaging	5
Gelatine	Hydrothermal treatment at 200°C	31.6	Bioimaging	6
Chicken egg	Plasma irradiation (50 V, 2.4 A)	6.8	Printing	7
Agarose	Agarose and EDA , 200°C , Hydrothermal, treatment , 6h	76	Bioimaging, printing,	Our

Comparative chart of Quantum yield performance of some Carbon dots

References (Supplementary):

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